

Quarterly Groundwater Monitoring Report

Fourth Quarter 2005

**City of Arcata Corporation Yard
Arcata, California
Case No. 1NHU767**

Prepared for:

The City of Arcata



Consulting Engineers & Geologists, Inc.

812 W. Wabash Avenue
Eureka, CA 95501-2138
707/441-8855

January 2006
000108.100



CONSULTING ENGINEERS & GEOLOGISTS, INC.

812 W. Wabash • Eureka, CA 95501-2138 • 707-441-8855 • Fax 707-441-8877 • info@shn-eureka.com

Reference: 000108.100

January 20, 2006

**Mr. Kim Watson, Superintendent of Public Works
City of Arcata
736 F Street
Arcata, CA 95521**

**Subject: Quarterly Groundwater Monitoring Report, Fourth Quarter 2005, City
of Arcata Corporation Yard, 600 South G Street, Arcata, California; Case
No. 1NHU767**

Dear Mr. Watson:

This report presents the results of the quarterly groundwater-monitoring event and biopile monitoring at the City of Arcata, Department of Public Works corporation yard for the fourth quarter of 2005. This work was performed by SHN Consulting Engineers & Geologists, Inc. (SHN) in accordance with our service agreement with the City of Arcata. City of Arcata employees conducted the third quarter monitoring activities on, October 19, 2005.

SHN is requesting closure of the biopile.

If you have any questions, please call me at 707/441-8855.

Sincerely,

SHN Consulting Engineers & Geologists, Inc.

Mike Foget, P.E.
Project Engineer

MKF/ADM:lms

Attachment: Report

copy w/attach: Karen Diemer, City of Arcata
Ron Allen, RWQCB
Melissa Martel, HCDEH

Reference: 000108.100

Quarterly Groundwater Monitoring Report

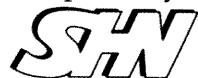
Fourth Quarter 2005

City of Arcata Corporation Yard
600 South G Street
Arcata, California

Prepared for:

The City of Arcata

Prepared by:



Consulting Engineers & Geologists, Inc.
812 W. Wabash Avenue
Eureka, CA 95501-2138
707/441-8855

January 2006



QA/QC:MKF *[Signature]*

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Abbreviations and Acronyms

<	Denotes a value that is "less than" the method detection limit
ug/L	micrograms per Liter
BTEX	Benzene, Toluene, Ethylbenzene, and total Xylenes
DIPE	Diisopropyl Ether
EPA	(U. S.) Environmental Protection Agency
ETBE	Ethyl Tertiary-Butyl Ether
MSL	Mean Sea Level
MTBE	Methyl Tertiary-Butyl Ether
MW-	Monitoring Well-number
SHN	SHN Consulting Engineers & Geologists, Inc.
SW-	(excavation pit) sidewall-number
TAME	Tertiary-Amyl Butyl Ether
TBA	Tertiary-Butyl Alcohol
TPHD	Total Petroleum Hydrocarbons as Diesel
TPHG	Total Petroleum Hydrocarbons as Gasoline
TPHMO	Total Petroleum Hydrocarbons as Motor Oil

1.0 Introduction

This report presents the results of groundwater monitoring activities and monthly biopile monitoring for the fourth quarter 2005, conducted at the City of Arcata corporation yard. Under the direction of SHN Consulting Engineers & Geologists, Inc. (SHN), the City of Arcata conducted the quarterly monitoring of 6 groundwater wells located at their corporation yard. The site is located on South G Street adjacent to Butcher's Slough and Arcata Bay. The corporation yard houses the City of Arcata's wastewater treatment plant and the Department of Public Works' vehicle maintenance and equipment storage facilities. The site lies within Section 32 of Township 5 North, Range 1 East, Humboldt Base and Meridian (Figure 1).

Fourth quarter 2005 monitoring activities are presented in 5 sections. This section serves as an introduction for the report. Section 2.0 describes the field program for the work conducted during this monitoring event. Section 3.0 includes a discussion of the results of the monitoring activities. Section 4.0 presents our conclusions and site recommendations. Section 5.0 includes references cited in this report.

The objective of this work was to assess groundwater conditions beneath the site over time.

2.0 Field Activities

2.1 Monitoring Well Sampling

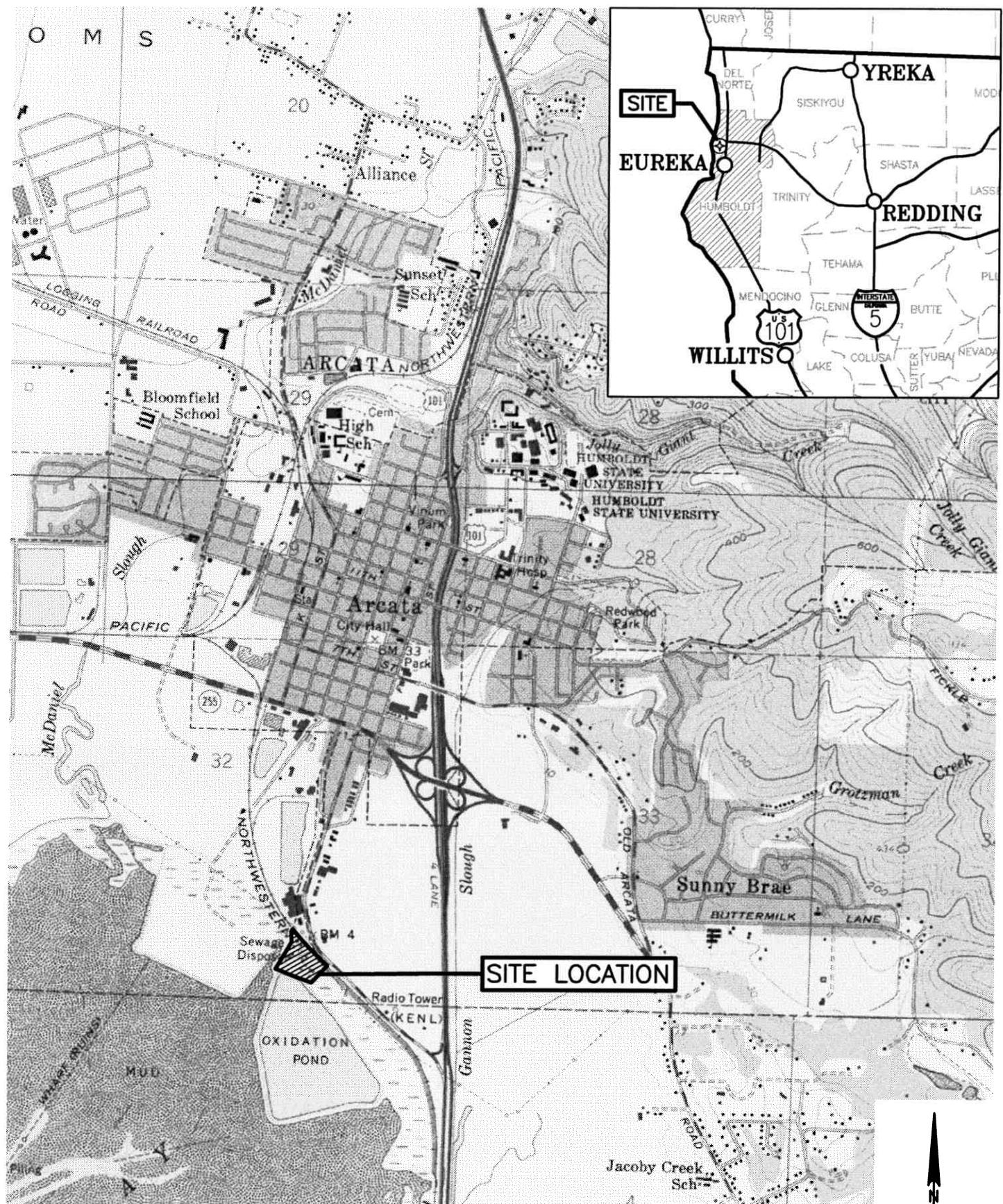
On October 19, 2005, City of Arcata personnel performed groundwater monitoring in wells MW-1 through MW-6, to aid in assessing current groundwater conditions beneath the site, including the direction of groundwater flow. A site map showing the locations of the existing monitoring wells is included as Figure 2. As part of the groundwater-monitoring program, each well was measured for depth to groundwater and sampled for water quality. During purging, each well was monitored for electrical conductivity and temperature using portable instrumentation, and pH was measured using portable pH test strips.

Upon completion of the well purging activities, a groundwater sample was collected from each well using a disposable polyethylene bailer, and transferred into laboratory-supplied containers. The water samples were then labeled, stored in an iced cooler, and transported to the laboratory under proper chain-of-custody documentation. Field notes from the October 19, 2005, groundwater-monitoring event are included in Appendix A.

2.2 Laboratory Analytical Methods

Each of the groundwater samples was analyzed for:

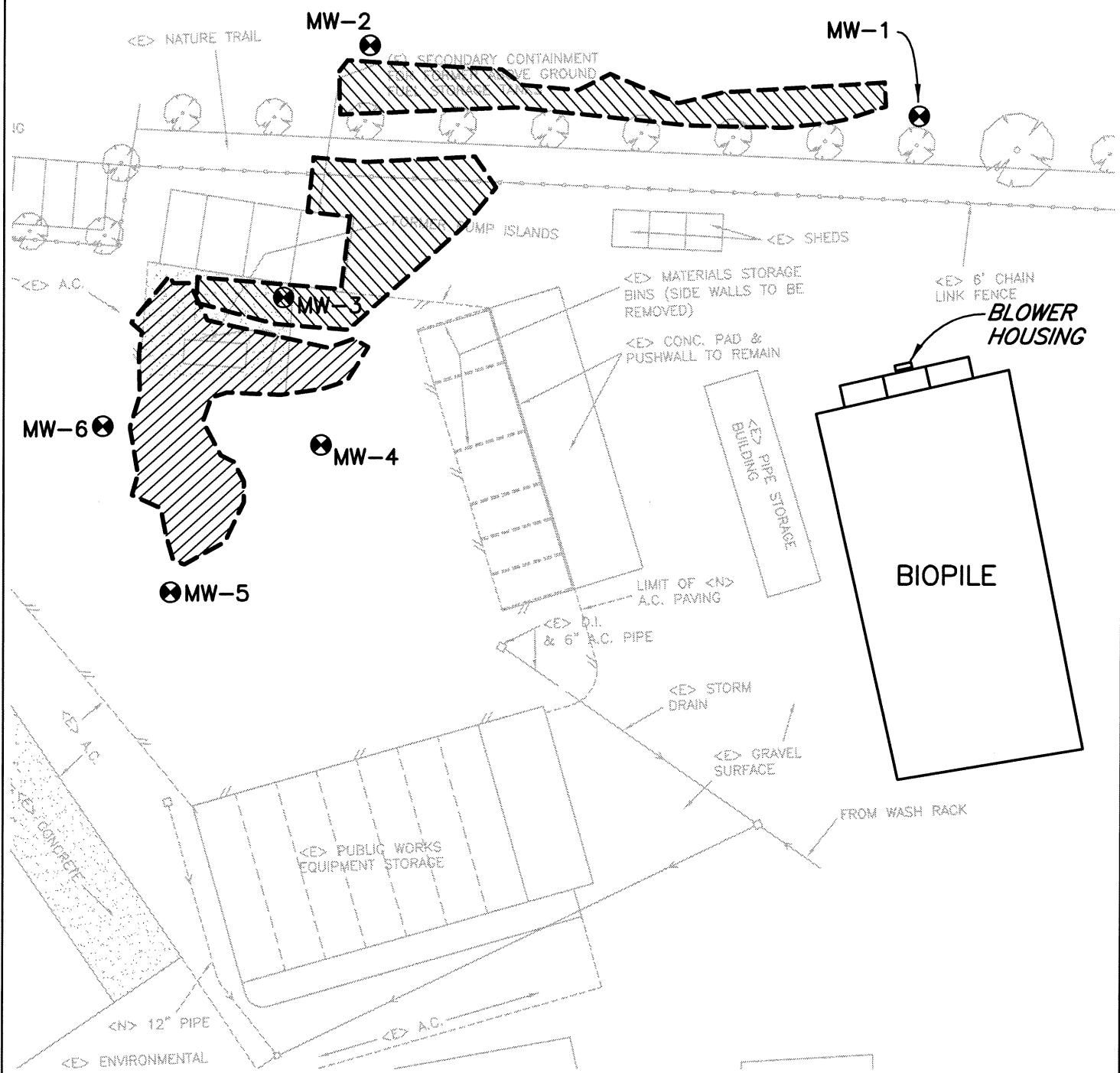
- Total Petroleum Hydrocarbons as Diesel (TPHD) with silica gel clean up in general accordance with U.S. Environmental Protection Agency (EPA) Method No. 3510 GCFID.
- Total Petroleum Hydrocarbons as Gasoline (TPHG) and Benzene, Toluene, Ethylbenzene, and total Xylenes (BTEX) in general accordance with EPA Method No. 8260B Modified.
- Fuel Oxygenates in general accordance with EPA Method No. 8260B Modified.



SOURCE: ARCATA NORTH & SOUTH
USGS 7.5 MINUTE
QUADRANGLE

1"=2000'±

 Consulting Engineers & Geologists, Inc.	City of Arcata Corp. Yard 600 South G Street Arcata, California	Site Location Map SHN 000108.100 December, 2005 000108.100-VIC-MAP Figure 1
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EXPLANATION

MW-5 MONITORING WELL LOCATION AND DESIGNATION



LIMIT OF EXCAVATION
NOVEMBER 2000



LIMIT OF EXCAVATION
OCTOBER 2001

1"=40'±

North Coast Laboratories Ltd., a state-certified analytical laboratory located in Arcata, California, performed all of the sample analyses.

2.3 Equipment Decontamination Procedures

All well purging and sampling equipment was cleaned prior to being transported to the corporation yard site. All small equipment that required on-site cleaning was decontaminated using the triple wash system. The equipment was first washed in a water solution containing Liquinox® cleaner, followed by a water rinse, then by a distilled water rinse. All of the groundwater samples were collected using pre-cleaned, disposable bailers, and transferred into laboratory-supplied containers.

2.4 Investigation-Derived Wastewater Management

Water used for decontaminating field equipment and all well purge water was placed into 5-gallon buckets, and subsequently transported to, and disposed of at, the City of Arcata wastewater treatment facility.

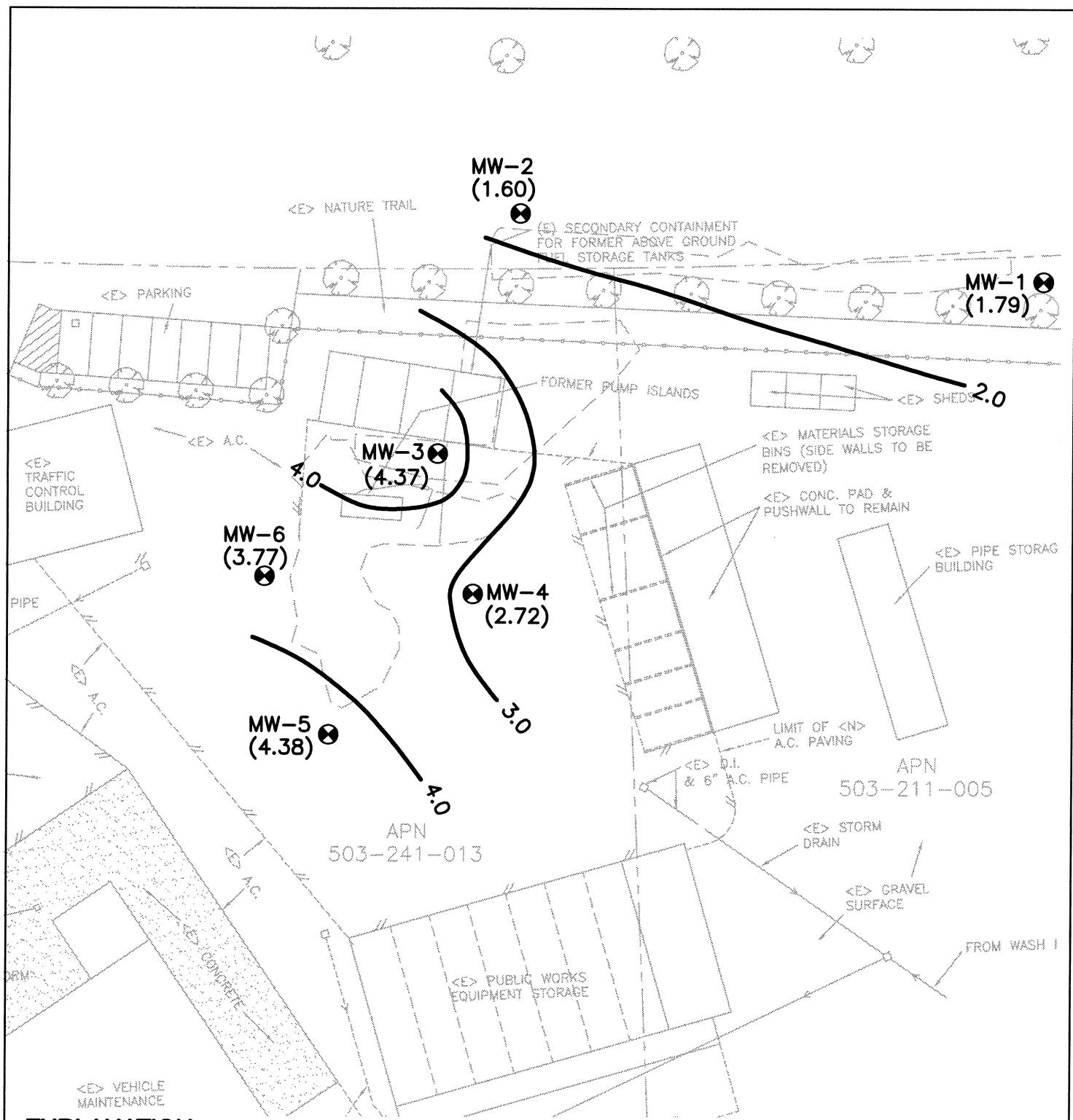
3.0 Groundwater Monitoring Results

3.1 Hydrogeology

Depth-to-groundwater measurements were collected from each monitoring well prior to sampling, and are shown in Table 1. On October 19, 2005, the direction of groundwater flow beneath the site was inconsistent (Figure 3). Historical groundwater elevation data are included in Appendix B, Table B-1.

Table 1 Groundwater Elevations, October 19, 2005 City of Arcata Corporation Yard, Arcata, California			
Sample Location	Top of Casing Elevation ¹ (feet MSL) ²	Depth To Water (feet) ³	Water Surface Elevation ¹ (feet MSL)
MW-1	8.73	6.94	1.79
MW-2	9.86	8.26	1.60
MW-3	6.97	2.60	4.37
MW-4	6.96	4.24	2.72
MW-5	6.83	2.45	4.38
MW-6	6.73	2.96	3.77

1. Top of casing elevation referenced to City of Arcata Bench Mark #4, elevation.
2. Mean Sea Level (MSL).
3. Depth to water in feet below top of casing.



3.2 Groundwater Analytical Results

The laboratory analytical results from the October 19, 2005, groundwater-monitoring event are summarized in Table 2, and shown on Figure 4.

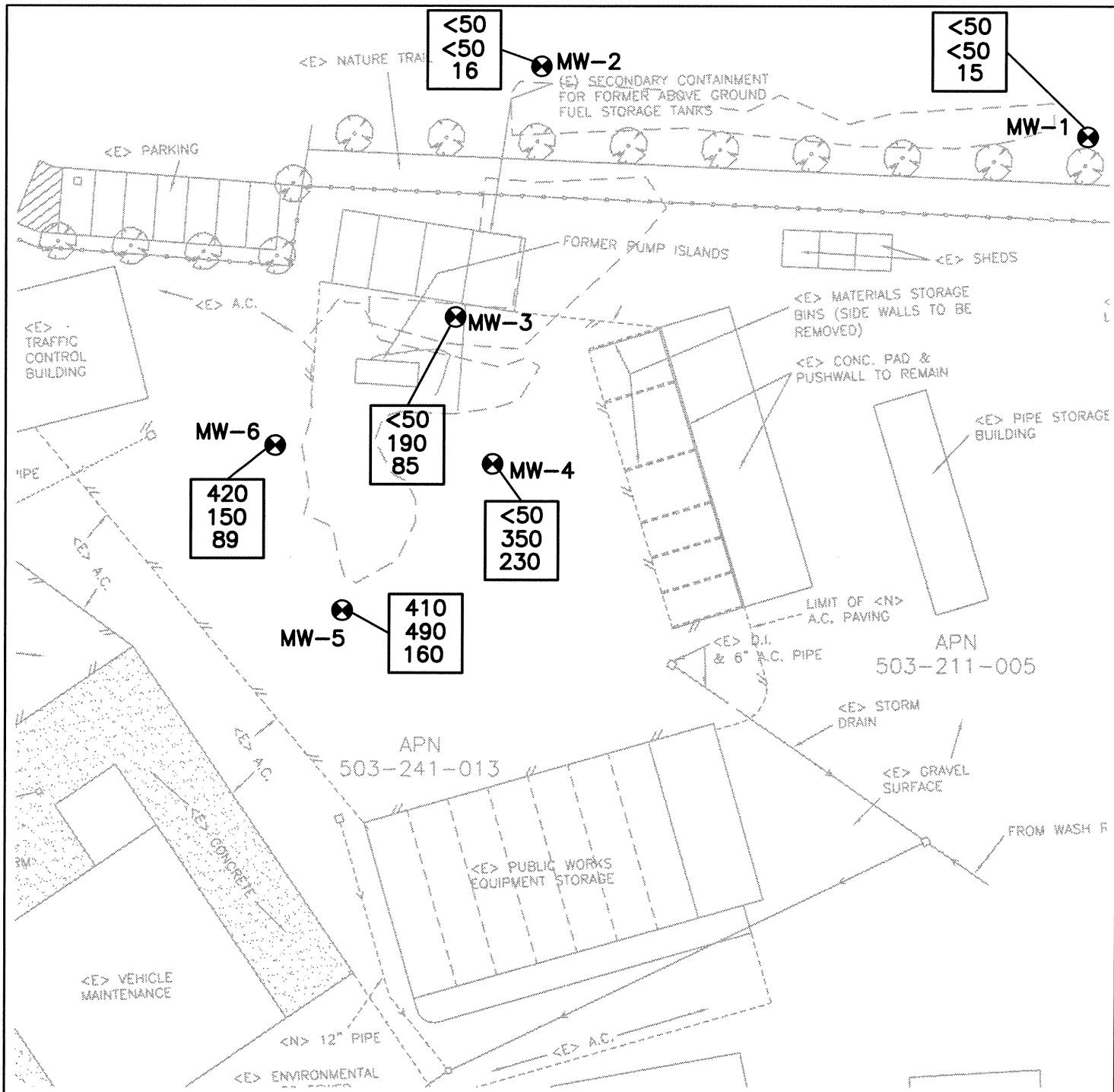
Table 2
Groundwater Analytical Results, October 19, 2005
City of Arcata Corporation Yard, Arcata, California
(in ug/L)¹

Sample Location	TPHD ²	TPHG ³	B ³	T ³	E ³	X ³	MTBE ³	TBA ³	DIPE ³	ETBE ³	TAME ³
MW-1	<50 ⁴	<50	<0.50	<0.50	<0.50	<1.0	15	<10	<1.0	<1.0	<1.0
MW-2	<50	<50	<0.50	<0.50	<0.50	<1.0	16	<10	<1.0	<1.0	1.1
MW-3	<50	190 ⁵	1.1	<0.50	<0.50	<1.0	85	<30 ⁶	<1.0	<1.0	6.2
MW-4	<50	350 ⁷	<0.50	<0.50	<0.50	<1.0	230	86	<1.0	<1.0	7.9
MW-5	410 ⁸	490 ⁹	<0.50	<0.50	<0.50	<1.0	160	<60 ⁶	<1.0	<1.0	4.4
MW-6	420 ¹⁰	150 ⁷	<0.50	<0.50	<0.50	<1.0	89	<40 ⁶	<1.0	<1.0	3.4

1. ug/L: micrograms per liter.
2. TPHD: Total Petroleum Hydrocarbons as Diesel analyzed in general accordance with EPA Method 3510/GCFID.
3. TPHG: Total Petroleum Hydrocarbons as Gasoline; Benzene, Toluene, Ethylbenzene and total Xylenes (BTEX); Methyl Tertiary-Butyl Ether (MTBE), Tertiary-Butyl Alcohol (TBA), Diisopropyl Ether (DIPE), Ethyl Tertiary-Butyl Ether (ETBE), and Tertiary-Amyl Butyl Ether (TAME), analyzed in general accordance with EPA Method 8260B.
4. <: Denotes a value that is "less than" the method detection limit.
5. Sample includes the reported gasoline components and additives in addition to other peaks in the gasoline range.
6. Reporting limits were raised due to matrix interference.
7. Results are primarily from the reported gasoline additives.
8. Sample contains material in the diesel range of molecular weights, but the material does not exhibit the peak pattern typical of diesel oil.
9. Result includes the reported gasoline additives in addition to other peaks in the gasoline range.
10. Sample contains material similar to degraded or weathered diesel oil.

TPHD was detected in the groundwater samples collected from wells MW-5 and MW-6 at concentrations of 410 micrograms per liter (ug/L) and 420 ug/L, respectively. TPHG was detected in the groundwater samples collected from 4 of the monitoring wells, at concentrations ranging from 150 ug/L in well MW-6, to 490 ug/L in well MW-5. TPHG was not detected in the groundwater samples collected from MW-1 and MW-2. TPHG values observed in wells MW-3, MW-4, and MW-6 are primarily from gasoline additives. Benzene was detected in the groundwater sample collected from well MW-3 at a concentration of 1.1 ug/L. No detectable concentrations of toluene, ethylbenzene, or total xylenes were present in any groundwater samples collected during the October 19, 2005 sampling event.

Methyl Tertiary-Butyl Ether (MTBE) was detected in all of the groundwater samples that were collected during the October 19, 2005, monitoring event. Historical groundwater analytical results are presented in Appendix B, Table B-2. The complete laboratory analytical report and corresponding chain-of-custody documentation are included in Appendix C.



EXPLANATION

MW-5 MONITORING WELL LOCATION AND DESIGNATION

410
490
160

TPHD
TPHG
MTBE

RESULTS IN ug/l

1"=40'±

3.3 Groundwater Extraction and Treatment System

The groundwater extraction and treatment system was operated from May 2004 to April 2005. The system extracted and treated approximately 96,000 gallons of groundwater.

3.4 Biopile Monitoring

The biopile was constructed in September 2003 and is currently monitored for blower manifold readings, soil temperature readings, and general condition observations. Field notes from the fourth quarter biopile monitoring are included in Appendix A.

4.0 Discussion and Recommendations

The results of this quarterly monitoring program indicate that groundwater at the corporation yard site has been impacted by petroleum hydrocarbons and fuel oxygenates. The groundwater extraction and treatment system was taken off line in April 2005. SHN is recommending that the system be replaced with an air sparging system. SHN conducted an air sparge pilot test on April 29, 2005, using the existing groundwater extraction piping located at the base of the October 2001 excavation pit (SW-1). Results of the pilot test are presented in a report of findings (SHN, May 2005).

Based on the reduction of TPHG and TPHD concentrations in the biopile soil, SHN is recommending closure for the biopile. Pending closure approval, SHN will collect 4 samples for every 100 cubic yards of soil and the analytical laboratory will composite each set of four samples into one for analysis. Using the approximate 1,000 cubic yard volume of the biopile, 10-four point composite samples will be analyzed. Soil samples will be analyzed for TPH as Motor Oil (TPHMO), TPHD, TPHG, BTEX, and MTBE.

SHN is also recommending that the biopile soil be moved to a 30,000-square foot area located west of marsh #3 at the Arcata Corp Yard site, where it will be spread out, mulched, seeded, and fertilized to promote final treatment by means of phyto-remediation and reduce any erosion of soils as described in SHN's 3rd quarter 2005 groundwater monitoring report dated December 16, 2005,

5.0 References Cited

- SHN Consulting Engineers & Geologists, Inc. (May 2005). *Remedial Action Pilot Study, Report of Findings, City of Arcata Corporation Yard, 600 South G Street, Arcata, California*. Eureka: SHN
- . (December 16, 2005). *Quarterly Groundwater Monitoring Report Third Quarter 2005, City of Arcata Corporation Yard, Arcata, California, Case No. 1NHU767*. Eureka: SHN.

Appendix A
Field Notes



DAILY FIELD REPORT

Job No. 000108.100

Page _____ of _____

Daily Field Report Sequence No

Project Name <i>Arcata Corp Yard</i>	Client/Owner <i>City of Arcata</i>	
General Location Of Work	Owner/Client Representative	Date <i>10/20/05</i> Day Of Week <i>Three</i>
General Contractor	Grading Contractor	Project Engineer <i>Mike Foget</i>
Type Of Work	Grading Contractor, Superintendent, Or Foreman	Supervisor
Source & Description Of Fill Material	Weather <i>Overcast</i>	Technician <i>Dustin Tibbetts</i>
Key Persons Contacted (Civil Engr, Architect, Developer, Etc)		

Describe Equipment Used For Hauling, Spreading, Watering, Conditioning, & Compacting

1147 On site. Taking readings.
1205 packed up.
1210 off site

Copy given to:

Reported By:

Dustin Tibbetts

Monthly Monitoring
City of Arcata, Corp Yard
000108.100

Technician: <u>DCT</u>	Date: <u>10/20/05</u>	Time: <u>1147</u>	
Weather Conditions: <u>over cast</u>		Ambient Air Temperature: <u>65</u>	
Time Settings Before Adjustments:			
Blower "A": ON from <u>8 am</u> to <u>4 pm</u>			
Blower "B": ON from <u>8 am</u> to <u>4 pm</u>			
Time Settings After Adjustments:			
Blower "A": ON from _____ to _____			
Blower "B": ON from _____ to _____			
Blower "A" Manifold Readings:			
Line Temperature: <u>60</u> °F			
Line Pressure: <u>4.75</u> in-H ₂ O			
Air Velocity (Line 1) <u>1405</u> ft/min Air Velocity (Line 2) <u>2240</u> ft/min			
Air Velocity (Line 3) <u>2450</u> ft/min Air Velocity (Line 4) <u>2275</u> ft/min			
Blower "B" Manifold Readings:			
Line Temperature: <u>60</u> °F			
Line Pressure: <u>N/A</u> in-H ₂ O			
Soil Vapor Readings:			
Gas Meter Used:			
Gas Meter Calibration:			
Sample Port	VOC's (ppm)	O ₂ (%)	CO ₂ (%)
#1			
#2			
#3			
#4			
#5			
Soil Temperature Readings:			
#1	#2	#3	#4
<u>60</u> °F	<u>60</u> °F	<u>missing</u> °F	<u>72</u> °F
Condition of Bio-Pile Cover: <u>Needs to be pull up on North side.</u>			
Condition of Cover Hold-Downs: <u>good.</u>			
Additional Observations:			

CITY OF ARCATA - CORP YARD

10/19/05

WELL NO.
TOTAL DEPTH
DEPTH
TO WATER

MN-1

17.80

6.94

ELEVATION

WATER

ELEVATION

REG'D OCT 21 2005

HT OF WATER COLUMN

10.96

X(0.16) Casing Vol $1.75 \times 3 = 5.25$ gal

TOTAL
INITIAL WATER VOLUME _____

SAMPLING EQUIPMENT
SAMPLE TIME
SAMPLE ANALYSIS
LABORATORY
REMARKS

CITY OF ALEXATA - CORR YARD

10/19/05

WELL NO.	<u>MW-2</u>
TOTAL DEPTH	<u>18.35</u>
DEPTH	
TO WATER	<u>8.26</u>

ELEVATION _____
WATER _____
ELEVATION _____

HT OF WATER COLUMN 10.09 X (0.16) CASING VOL $161 \times 3 = 4.84$

TOTAL

INITIAL WATER VOLUME	
----------------------	--

SAMPLING EQUIPMENT
SAMPLE TIME
SAMPLE ANALYSIS
LABORATORY
REMARKS

WELL NO.
TOTAL DEPTH
DEPTH
TO WATER

M.W. - 3
14.70

LEVEL
WATER
LEVEL

10/19/05

HT OF WATER COLUMN 12.10 X(0.16) Casing VOL $1.93 \times 3 = 5.80$ gal

TOTAL
INITIAL WATER VOLUME

SAMPLING EQUIPMENT
SAMPLE TIME
SAMPLE ANALYSIS
LABORATORY
REMARKS

CITY OF EUREKA - CORP YARD

10/19/05

WELL NO.

MW-4

TOTAL DEPTH

~~MW-4
14.70~~

DEPTHS

4.24

ELEVATION

WATER

ELEVATION

HT OF WATER COLUMN

10.46

X (0.16) Casing Vol $1.67 \times 3 = 5.02$ gal

**TOTAL
INITIAL WATER VOLUME** _____

SAMPLING EQUIPMENT

DISPOSABLE BAILER

SAMPLE TIME

82100 LWT 1 - TPHR

SAMPLE ANALYSIS

N.C. 1

LABORATORY

REMARKS

CITY OF ACCATA - CORP YARD

10/19/05

WELL NO.	<u>MW-5</u>
TOTAL DEPTH	<u>14.85</u>
DEPTH	
TO WATER	<u>2.45</u>

LEVEL
WATER
LEVEL

HT OF WATER COLUMN 12.40 x (0.16) CASING VOL 1.98 x 3 = 5.95 gal

TOTAL
INITIAL WATER VOLUME

SAMPLING EQUIPMENT
SAMPLE TIME
SAMPLE ANALYSIS
LABORATORY
REMARKS

CITY OF ARCATA

FIELD SAMPLING LOG

PROJECT #	
CLIENT	
WELL NO.	
TOTAL DEPTH	City mly-6 1475
DEPTH	
TO WATER	2.96

DATE	<u>10/19/05</u>
SAMPLER	
ELEVATION	
WATER	
ELEVATION	

HT OF WATER COLUMN 11.79 x (0.16) Casing VOL 1.87x3 = 5.61 gal

TOTAL _____
INITIAL WATER VOLUME

SAMPLING EQUIPMENT
SAMPLE TIME
SAMPLE ANALYSIS
LABORATORY
REMARKS

Appendix B

Historic Monitoring Data

Table B-1
Historical Groundwater Elevations
City of Arcata Corporation Yard, Arcata, CA

Sample Location	Sample Date	Elevation ¹ (feet MSL) ²	Depth to Water (feet) ³	Elevation (feet MSL)
MW-1	9/26/2002	8.73	7.73	1.00
	1/22/2003		5.79	2.94
	4/23/2003		5.33	3.40
	7/23/2003		6.60	2.13
	10/22/2003		7.34	1.39
	1/21/2004		3.90	4.83
	4/21/2004		3.81	4.92
	7/21/2004		5.72	3.01
	10/7/2004		7.33	1.40
	1/19/2005		5.80	2.93
	4/20/2005		4.73	4.00
	7/20/2005		5.35	3.38
	10/19/2005		6.94	1.79
MW-2	9/27/2002	9.86	8.82	1.04
	1/22/2003		6.44	3.42
	4/23/2003		9.38	0.48
	7/23/2003		8.90	0.96
	10/22/2003		8.70	1.16
	1/21/2004		7.38	2.48
	4/21/2004		9.53	0.33
	7/21/2004		8.10	1.76
	10/7/2004		8.76	1.10
	1/19/2005		9.00	0.86
	4/20/2005		8.72	1.14
	7/20/2005		8.70	1.16
	10/19/2005		8.26	1.60
MW-3	9/26/2002	6.97	2.84	4.13
	1/22/2003		1.36	5.61
	4/23/2003		1.11	5.86
	7/23/2003		2.50	4.47
	10/22/2003		2.81	4.16
	1/21/2004		3.27	3.70
	4/21/2004		1.00	5.97
	7/21/2004		2.95	4.02
	10/7/2004		3.59	3.38
	1/19/2005		1.45	5.52
	4/20/2005		1.02	5.95
	7/20/2005		2.10	4.87
	10/19/2005		2.60	4.37

Table B-1
Historical Groundwater Elevations
City of Arcata Corporation Yard, Arcata, CA

Sample Location	Sample Date	Elevation ¹ (feet MSL) ²	Depth to Water (feet) ³	Elevation (feet MSL)
MW-4	9/27/2002	6.96	4.01	2.95
	1/22/2003		2.36	4.60
	4/23/2003		2.35	4.61
	7/23/2003		2.50	4.46
	10/22/2003		4.34	2.62
	1/21/2004		1.26	5.70
	4/21/2004		3.67	3.29
	7/21/2004		5.20	1.76
	10/7/2004		4.15	2.81
	1/19/2005		3.75	3.21
	4/20/2005		3.52	3.44
	7/20/2005		2.00	4.96
	10/19/2005		4.24	2.72
MW-5	9/26/2002	6.83	2.70	4.13
	1/22/2003		1.24	5.59
	4/23/2003		1.05	5.78
	7/23/2003		2.30	4.53
	10/22/2003		2.68	4.15
	1/21/2004		1.18	5.65
	4/21/2004		0.50	6.33
	7/21/2004		3.80	3.03
	10/7/2004		2.95	3.88
	1/19/2005		1.41	5.42
	4/20/2005		1.05	5.78
	7/20/2005		1.90	4.93
	10/19/2005		2.45	4.38
MW-6	9/27/2002	6.73	5.11	1.62
	1/22/2003		3.23	3.50
	4/23/2003		1.91	4.82
	7/23/2003		5.60	1.13
	10/22/2003		3.75	2.98
	1/21/2004		1.71	5.02
	4/21/2004		5.65	1.08
	7/21/2004		2.70	4.03
	10/7/2004		3.16	3.57
	1/19/2005		1.80	4.93
	4/20/2005		1.00	5.73
	7/20/2005		1.70	5.03
	10/19/2005		2.96	3.77

1. Top of casing elevation referenced to City of Arcata Bench Mark #4, elevation

2. Mean Sea Level (MSL).

3. Below Top of Casing

Table B-2
Historical Groundwater Analytical Results
City of Arcata Corporation Yard, Arcata, CA
(in ug/L)¹

Sample Location	Date	TPHD ²	TPHG ³	B ³	T ³	E ³	X ³	MTBE ³	TBA ³	DIPE ³	ETBE ³	TAME ³
MW-1	9/26/2002	<50 ⁴	<50	<0.50	<0.50	<0.50	<0.50	4.3	<20	<1.0	<1.0	<1.0
	1/22/2003	<50	<50	<0.50	<0.50	<0.50	<0.50	34	<20	<1.0	<1.0	1.3
	4/23/2003	<50	<50	<0.50	<0.50	<0.50	<0.50	21	<20	<1.0	<1.0	1.1
	7/23/2003	<50	76	<0.50	<0.50	<0.50	<0.50	100	<20	<1.0	<1.0	4.4
	10/22/2003	<50	75	<0.50	<0.50	<0.50	<0.50	35	<20	<1.0	<1.0	1.6
	1/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	5	<20	<1.0	<1.0	<1.0
	4/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	9.1	<10	<1.0	<1.0	<1.0
	7/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	31	<10	<1.0	<1.0	1.1
	10/7/2004	<50	<50	<0.50	<0.50	<0.50	<1.0	20	<10	<1.0	<1.0	<1.0
	1/19/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	4.6	<10	<1.0	<1.0	<1.0
	4/20/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	5.9	<10	<1.0	<1.0	<1.0
	7/20/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	14	<10	<1.0	<1.0	<1.0
	10/19/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	15	<10	<1.0	<1.0	<1.0
MW-2	9/27/2002	820	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<1.0	<1.0	<1.0
	1/22/2003	<50	72	<0.50	<0.50	<0.50	<0.50	130	<20	<1.0	<1.0	9.8
	4/23/2003	<50	<50	<0.50	<0.50	<0.50	<0.50	57	<20	<1.0	<1.0	3.5
	7/23/2003	<50	52	<0.50	<0.50	<0.50	<0.50	59	<20	<1.0	<1.0	3.4
	10/22/2003	<50	64	<0.50	<0.50	<0.50	<0.50	37	<20	<1.0	<1.0	2.2
	1/21/2004	<50	83	<0.50	<0.50	<0.50	<0.50	61	<20	<1.0	<1.0	3.8
	4/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	22	<10	<1.0	<1.0	1.5
	7/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	24	<10	<1.0	<1.0	1.5
	10/7/2004	<50	<50	<0.50	<0.50	<0.50	<1.0	26	<10	<1.0	<1.0	1.5
	1/19/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	33	<10	<1.0	<1.0	1.7
	4/20/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	31	<10	<1.0	<1.0	1.8
	7/20/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	22	<10	<1.0	<1.0	1.3
	10/19/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	16	<10	<1.0	<1.0	1.1
MW-3	9/26/2002	<50	990	63	<0.50	<0.50	<0.50	860	58	<1.0	<1.0	55
	1/22/2003	220	1,600	110	13	41	50.9	990	250	<1.0	<1.0	75
	4/23/2003	150	660	55	1.1	3	1.5	720	82	<1.0	<1.0	48
	7/23/2003	83	210	120	<0.50	<0.50	<0.50	530	94	<1.0	<1.0	11
	10/22/2003	330	720	26	<0.50	<0.50	<0.50	570	32	<1.0	<1.0	32
	1/21/2004	78	740	58	5.7	17	8.2	310	<90	<1.0	<1.0	25
	4/21/2004	<50	360	77	1.4	1.7	0.88	120	<28	<1.0	<1.0	7.2
	7/21/2004	130	260	<0.50	<0.50	<0.50	<0.50	280	43	<1.0	<1.0	9.7
	10/7/2004	57	640	1.6	<0.50	<0.50	<0.50	450	64	<1.0	<1.0	28
	1/19/2005	<50	120	1.5	<0.50	<0.50	<1.0	110	<45	<1.0	<1.0	4
	4/20/2005	<50	67	0.59	<0.50	<0.50	<1.0	65	<15	<1.0	<1.0	2
	7/20/2005	<50	200	<0.50	<0.50	<0.50	<1.0	220	<50	<1.0	<1.0	7.6
	10/19/2005	<50	190	1.1	<0.50	<0.50	<1.0	85	<30	<1.0	<1.0	6.2

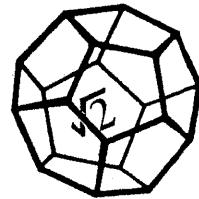
Table B-2
Historical Groundwater Analytical Results
City of Arcata Corporation Yard, Arcata, CA
(in ug/L)¹

Sample Location	Date	TPHD ²	TPHG ³	B ³	T ³	E ³	X ³	MTBE ³	TBA ³	DIPE ³	ETBE ³	TAME ³
MW-4	9/27/2002	<50	270	<0.50	<0.50	<0.50	<0.50	270	32	<1.0	<1.0	6.2
	1/22/2003	150	250	<0.50	<0.50	<0.50	<0.50	340	170	<1.0	<1.0	13
	4/23/2003	110	520	<0.50	<0.50	<0.50	<0.50	350	160	<1.0	<1.0	11
	7/23/2003	<50	1,000	160	3	0.78	4.1	330	66	<1.0	<1.0	41
	10/22/2003	130	290	<0.50	<0.50	<0.50	<0.50	260	62	<1.0	<1.0	6.5
	1/21/2004	97	550	<0.50	<0.50	<0.50	<0.50	580	190	<1.0	<1.0	16
	4/21/2004	<50	480	<0.50	<0.50	<0.50	<0.50	490	130	<1.0	<1.0	15
	7/21/2004	140	380	25	<0.50	<0.50	<0.50	500	29	<1.0	<1.0	22
	10/7/2004	<50	440	<0.50	<0.50	<0.50	<1.0	380	110	<1.0	<1.0	8.5
	1/19/2005	<50	410	<0.50	<0.50	<0.50	<1.0	380	<10	<1.0	<1.0	12
	4/20/2005	<50	320	<0.50	<0.50	<0.50	<1.0	370	<100	<1.0	<1.0	12
	7/20/2005	<50	370	<0.50	<0.50	<0.50	<1.0	380	95	<1.0	<1.0	11
	10/19/2005	<50	350	<0.50	<0.50	<0.50	<1.0	230	86	<1.0	<1.0	7.9
MW-5	9/26/2002	160	750	<0.50	<0.50	<0.50	<0.50	490	66	<1.0	<1.0	12
	1/22/2003	1,300	590	<0.50	0.87	<0.50	<0.50	330	160	<1.0	<1.0	13
	4/23/2003	1,100	520	<0.50	<0.50	<0.50	<0.50	280	56	<1.0	<1.0	8.1
	7/23/2003	930	150	<0.50	<0.50	<0.50	<0.50	300	35	<1.0	<1.0	6.2
	10/22/2003	3,400	780	<0.50	<0.50	<0.50	<0.50	320	41	<1.0	<1.0	7.7
	1/21/2004	810	610	<0.50	<0.50	<0.50	<0.50	300	<120	<1.0	<1.0	8.2
	4/21/2004	180	430	<0.50	<0.50	<0.50	<0.50	200	<60	<1.0	<1.0	6.2
	7/21/2004	50	320	<0.50	<0.50	<0.50	<0.50	420	110	<1.0	<1.0	12
	10/7/2004	610	780	<0.50	<0.50	<0.50	<1.0	290	57	<1.0	<1.0	7.2
	1/19/2005	440	530	<0.50	<0.50	<0.50	<1.0	240	<90	<1.0	<1.0	6
	4/20/2005	120	210	<0.50	<0.50	<0.50	<1.0	160	<30	<1.0	<1.0	5.3
	7/20/2005	880	550	<0.50	<0.50	<0.50	<1.0	230	39	<1.0	<1.0	5.3
	10/19/2005	410	490	<0.50	<0.50	<0.50	<1.0	160	<60	<1.0	<1.0	4.4
MW-6	9/27/2002	78	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<1.0	<1.0	<1.0
	1/22/2003	280	170	<0.50	<0.50	<0.50	<0.50	250	55	<1.0	<1.0	5.5
	4/23/2003	320	250	<0.50	<0.50	<0.50	<0.50	290	45	<1.0	<1.0	7.9
	7/23/2003	<50	510	<0.50	<0.50	<0.50	0.55	190	38	<1.0	<1.0	7.7
	10/22/2003	290	340	0.83	<0.50	<0.50	<0.50	290	36	<1.0	<1.0	7
	1/21/2004	290	310	<0.50	<0.50	<0.50	<0.50	270	<120	<1.0	<1.0	7.6
	4/21/2004	<50	290	0.67	<0.50	<0.50	<0.50	260	43	<1.0	<1.0	7.7
	7/21/2004	1,000	470	<0.50	<0.50	<0.50	<0.50	350	39	<1.0	<1.0	7.0
	10/7/2004	110	260	<0.50	<0.50	<0.50	<1.0	210	<80	<1.0	<1.0	5.7
	1/19/2005	81	170	<0.50	<0.50	<0.50	<1.0	130	46	<1.0	<1.0	4.1
	4/20/2005	440	500	<0.50	<0.50	<0.50	<1.0	180	<50	<1.0	<1.0	5.5
	7/20/2005	410	210	<0.50	<0.50	<0.50	<1.0	180	<60	<1.0	<1.0	5.6
	10/19/2005	420	150	<0.50	<0.50	<0.50	<1.0	89	<40	<1.0	<1.0	3.4

1. ug/L: micrograms per Liter
2. TPHD: Total Petroleum Hydrocarbons as Diesel, analyzed in general accordance with EPA Method 3510/GCFID.
3. TPHG: Total Petroleum Hydrocarbons as Gasoline, Benzene (B), Toluene (T), Ethylbenzene (E), and total Xylenes (X), Methyl Tertiary-ButylEther (MTBE), Tertiary-Butyl Alcohol (TBA), Diisopropyl Ether (DIPE), Ethyl Tertiary-Butyl Ether (ETBE), Tertiary-Amyl Butyl Ether (TAME), analyzed in general accordance with EPA Method 8260B.
4. <: Denotes a laboratory values less than the method detection limit.

Appendix C

Laboratory Analytical Reports



**NORTH COAST
LABORATORIES LTD.**

November 01, 2005

City of Arcata
Dept. of Public Works
736 F Street
Arcata, CA 95521
Attn: Kim Watson

RE: 000108100, Arcata Corp. Yard

Order No.: 0510458
Invoice No.: 53938
PO No.:
ELAP No. 1247-Expires July 2006

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	MW-1
01D	MW-1
02A	MW-2
02D	MW-2
03A	MW-4
03D	MW-4
04A	MW-6
04D	MW-6
05A	MW-3
05D	MW-3
06A	MW-5
06D	MW-5
07A	Travel Blank

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

All solid results are expressed on a wet-weight basis unless otherwise noted.

REPORT CERTIFIED BY

Laboratory Supervisor(s)

QA Unit

Jesse G. Chaney, Jr.
Laboratory Director

North Coast Laboratories, Ltd.

Date: 01-Nov-05

CLIENT: City of Arcata
Project: 000108100, Arcata Corp. Yard
Lab Order: 0510458

CASE NARRATIVE

All samples submitted for a silica gel cleanup were initially analyzed for diesel. The samples showing no detectable levels of the analyte were not subjected to the cleanup procedure.

TPH as Diesel with Silica Gel Cleanup - Water:

Sample MW-6 contains material similar to degraded or weathered diesel oil.

Sample MW-5 contains material in the diesel range of molecular weights, but the material does not exhibit the peak pattern typical of diesel oil.

TPH as Diesel:

The surrogate recovery for sample MW-2 was outside of the acceptance limits. The surrogate recoveries for the quality control samples were within acceptance limits. This indicates that the low surrogate recovery may be due to matrix effects from the sample.

Gasoline Components/Additives:

The gasoline value for sample MW-3 includes the reported gasoline components and additives in addition to other peaks in the gasoline range.

The gasoline value for sample MW-5 includes the reported gasoline additives in addition to other peaks in the gasoline range.

The gasoline values for samples MW-4 and MW-6 are primarily from the reported gasoline additives.

The TBA reporting limits were raised for samples MW-6, MW-3 and MW-5 due to matrix interference.

Date: 01-Nov-05
WorkOrder: 0510458

ANALYTICAL REPORT

Client Sample ID: MW-1
Lab ID: 0510458-01A

Received: 10/19/05

Collected: 10/19/05 0:00

Test Name: Gasoline Components/Additives

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	15	1.0	µg/L	1.0		10/28/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		10/28/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		10/28/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		10/28/05
Benzene	ND	0.50	µg/L	1.0		10/28/05
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		10/28/05
Toluene	ND	0.50	µg/L	1.0		10/28/05
Ethylbenzene	ND	0.50	µg/L	1.0		10/28/05
m,p-Xylene	ND	0.50	µg/L	1.0		10/28/05
o-Xylene	ND	0.50	µg/L	1.0		10/28/05
Surrogate: 1,4-Dichlorobenzene-d4	105	80.8-139	% Rec	1.0		10/28/05

Test Name: TPH as Gasoline

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		10/28/05

Client Sample ID: MW-1

Received: 10/19/05

Collected: 10/19/05 0:00

Lab ID: 0510458-01D

Test Name: TPH as Diesel

Reference: EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	10/21/05	10/21/05
Surrogate: N-Tricosane	93.6	70-130	% Rec	1.0	10/21/05	10/21/05

Date: 01-Nov-05
WorkOrder: 0510458

ANALYTICAL REPORT

Client Sample ID: MW-2 Received: 10/19/05 Collected: 10/19/05 0:00
Lab ID: 0510458-02A

Test Name: Gasoline Components/Additives

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	16	1.0	µg/L	1.0		10/28/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		10/28/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		10/28/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		10/28/05
Benzene	ND	0.50	µg/L	1.0		10/28/05
Tert-amyl methyl ether (TAME)	1.1	1.0	µg/L	1.0		10/28/05
Toluene	ND	0.50	µg/L	1.0		10/28/05
Ethylbenzene	ND	0.50	µg/L	1.0		10/28/05
m,p-Xylene	ND	0.50	µg/L	1.0		10/28/05
o-Xylene	ND	0.50	µg/L	1.0		10/28/05
Surrogate: 1,4-Dichlorobenzene-d4	106	80.8-139	% Rec	1.0		10/28/05

Test Name: TPH as Gasoline

Reference: LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		10/28/05

Client Sample ID: MW-2

Received: 10/19/05

Collected: 10/19/05 0:00

Lab ID: 0510458-02D

Test Name: TPH as Diesel

Reference: EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	10/21/05	10/21/05
Surrogate: N-Tricosane	67.2	70-130	% Rec	1.0	10/21/05	10/21/05

Date: 01-Nov-05
WorkOrder: 0510458

ANALYTICAL REPORT

Client Sample ID: MW-3 Received: 10/19/05 Collected: 10/19/05 0:00
Lab ID: 0510458-05A

Test Name: Gasoline Components/Additives

Reference: LUFT/EPA 8260B Modified

<u>Parameter</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>DF</u>	<u>Extracted</u>	<u>Analyzed</u>
Methyl tert-butyl ether (MTBE)	85	50	µg/L	50		10/29/05
Tert-butyl alcohol (TBA)	ND	30	µg/L	1.0		10/29/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		10/29/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		10/29/05
Benzene	1.1	0.50	µg/L	1.0		10/29/05
Tert-amyl methyl ether (TAME)	6.2	1.0	µg/L	1.0		10/29/05
Toluene	ND	0.50	µg/L	1.0		10/29/05
Ethylbenzene	ND	0.50	µg/L	1.0		10/29/05
m,p-Xylene	ND	0.50	µg/L	1.0		10/29/05
o-Xylene	ND	0.50	µg/L	1.0		10/29/05
Surrogate: 1,4-Dichlorobenzene-d4	108	80.8-139	% Rec	1.0		10/29/05

Test Name: TPH as Gasoline

Reference: LUFT/EPA 8260B Modified

<u>Parameter</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>DF</u>	<u>Extracted</u>	<u>Analyzed</u>
TPHC Gasoline	190	50	µg/L	1.0		10/29/05

Client Sample ID: MW-3

Received: 10/19/05

Collected: 10/19/05 0:00

Lab ID: 0510458-05D

Test Name: TPH as Diesel with Silica Gel Cleanup

Reference: EPA 3510/3630/GCFID(LUFT)/8015B

<u>Parameter</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>DF</u>	<u>Extracted</u>	<u>Analyzed</u>
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	10/27/05	10/31/05
Surrogate: N-Tricosane	69.5	38-129	% Rec	1.0	10/27/05	10/31/05

Date: 01-Nov-05
WorkOrder: 0510458

ANALYTICAL REPORT

Client Sample ID: MW-4 Received: 10/19/05 Collected: 10/19/05 0:00
Lab ID: 0510458-03A

Test Name:	Gasoline Components/Additives					
Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	230	50	µg/L	50		10/29/05
Tert-butyl alcohol (TBA)	86	10	µg/L	1.0		10/29/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		10/29/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		10/29/05
Benzene	ND	0.50	µg/L	1.0		10/29/05
Tert-amyl methyl ether (TAME)	7.9	1.0	µg/L	1.0		10/29/05
Toluene	ND	0.50	µg/L	1.0		10/29/05
Ethylbenzene	ND	0.50	µg/L	1.0		10/29/05
m,p-Xylene	ND	0.50	µg/L	1.0		10/29/05
o-Xylene	ND	0.50	µg/L	1.0		10/29/05
Surrogate: 1,4-Dichlorobenzene-d4	108	80.8-139	% Rec	1.0		10/29/05

Test Name:	TPH as Gasoline					
Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	350	50	µg/L	1.0		10/29/05

Client Sample ID: MW-4 Received: 10/19/05 Collected: 10/19/05 0:00
Lab ID: 0510458-03D

Test Name:	TPH as Diesel with Silica Gel Cleanup					
Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	10/27/05	10/31/05
Surrogate: N-Tricosane	50.1	38-129	% Rec	1.0	10/27/05	10/31/05

Date: 01-Nov-05
WorkOrder: 0510458

ANALYTICAL REPORT

Client Sample ID: MW-5 Received: 10/19/05 Collected: 10/19/05 0:00
Lab ID: 0510458-06A

Test Name:	Gasoline Components/Additives					
Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	160	50	µg/L	50		10/29/05
Tert-butyl alcohol (TBA)	ND	60	µg/L	1.0		10/29/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		10/29/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		10/29/05
Benzene	ND	0.50	µg/L	1.0		10/29/05
Tert-amyl methyl ether (TAME)	4.4	1.0	µg/L	1.0		10/29/05
Toluene	ND	0.50	µg/L	1.0		10/29/05
Ethylbenzene	ND	0.50	µg/L	1.0		10/29/05
m,p-Xylene	ND	0.50	µg/L	1.0		10/29/05
o-Xylene	ND	0.50	µg/L	1.0		10/29/05
Surrogate: 1,4-Dichlorobenzene-d4	111	80.8-139	% Rec	1.0		10/29/05

Test Name:	TPH as Gasoline					
Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	490	50	µg/L	1.0		10/29/05

Client Sample ID: MW-5 Received: 10/19/05 Collected: 10/19/05 0:00
Lab ID: 0510458-06D

Test Name:	TPH as Diesel with Silica Gel Cleanup					
Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	410	50	µg/L	1.0	10/27/05	10/31/05
Surrogate: N-Tricosane	52.6	38-129	% Rec	1.0	10/27/05	10/31/05

Date: 01-Nov-05
WorkOrder: 0510458

ANALYTICAL REPORT

Client Sample ID: MW-6 Received: 10/19/05 Collected: 10/19/05 0:00
Lab ID: 0510458-04A

Test Name:	Gasoline Components/Additives Reference: LUFT/EPA 8260B Modified					
Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	89	50	µg/L	50		10/29/05
Tert-butyl alcohol (TBA)	ND	40	µg/L	1.0		10/29/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		10/29/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		10/29/05
Benzene	ND	0.50	µg/L	1.0		10/29/05
Tert-amyl methyl ether (TAME)	3.4	1.0	µg/L	1.0		10/29/05
Toluene	ND	0.50	µg/L	1.0		10/29/05
Ethylbenzene	ND	0.50	µg/L	1.0		10/29/05
m,p-Xylene	ND	0.50	µg/L	1.0		10/29/05
o-Xylene	ND	0.50	µg/L	1.0		10/29/05
Surrogate: 1,4-Dichlorobenzene-d4	109	80.8-139	% Rec	1.0		10/29/05

Test Name:	TPH as Gasoline Reference: LUFT/EPA 8260B Modified					
Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	150	50	µg/L	1.0		10/29/05

Client Sample ID: MW-6 Received: 10/19/05 Collected: 10/19/05 0:00
Lab ID: 0510458-04D

Test Name:	TPH as Diesel with Silica Gel Cleanup Reference: EPA 3510/3630/GCFID(LUFT)/8015B					
Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	420	50	µg/L	1.0	10/27/05	10/31/05
Surrogate: N-Tricosane	84.8	38-129	% Rec	1.0	10/27/05	10/31/05

Date: 01-Nov-05
WorkOrder: 0510458

ANALYTICAL REPORT

Client Sample ID: Travel Blank
Lab ID: 0510458-07A

Received: 10/19/05

Collected:

Test Name: Gasoline Components/Additives

Reference: LUFT/EPA 8260B Modified

<u>Parameter</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>DF</u>	<u>Extracted</u>	<u>Analyzed</u>
Methyl tert-butyl ether (MTBE)	ND	1.0	µg/L	1.0		10/28/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		10/28/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		10/28/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		10/28/05
Benzene	ND	0.50	µg/L	1.0		10/28/05
Tert-aryl methyl ether (TAME)	ND	1.0	µg/L	1.0		10/28/05
Toluene	ND	0.50	µg/L	1.0		10/28/05
Ethylbenzene	ND	0.50	µg/L	1.0		10/28/05
m,p-Xylene	ND	0.50	µg/L	1.0		10/28/05
o-Xylene	ND	0.50	µg/L	1.0		10/28/05
Surrogate: 1,4-Dichlorobenzene-d4	107	80.8-139	% Rec	1.0		10/28/05

Test Name: TPH as Gasoline

Reference: LUFT/EPA 8260B Modified

<u>Parameter</u>	<u>Result</u>	<u>Limit</u>	<u>Units</u>	<u>DF</u>	<u>Extracted</u>	<u>Analyzed</u>
TPHC Gasoline	ND	50	µg/L	1.0		10/28/05

North Coast Laboratories, Ltd.

Date: 01-Nov-05

QC SUMMARY REPORT

Method Blank

Client ID:	Project:	Sample ID:	Batch ID:	Test Code:	Units:	Analysis Date:	Prep Date:
Analyte				Run ID:	µg/L	SeqNo:	
Methyl tert-butyl ether (MTBE)		MB-102805	R37734	82600XYW	µg/L	543585	
Tert-butyl alcohol (TBA)		Client ID:		ORGCMS3_051028B			
Di-isopropyl ether (DIPE)		Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit HighLimit RPD Ref Val %RPD RPD Limit RPD Limit Qual
Ethyl tert-butyl ether (ETBE)							
Benzene		Analyte					
Tert-amyl methyl ether (TAME)		MB-102805	Batch ID: R37732	Test Code: GASW-MS	Units: µg/L	543572	
Toluene		Client ID:		ORGCMS3_051028A			
Ethylbenzene		Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit HighLimit RPD Ref Val %RPD RPD Limit RPD Limit Qual
m,p-Xylene							
o-Xylene		Analyte					
1,4-Dichlorobenzene-d4		MB-102805	Batch ID: R37732	Test Code: GASW-MS	Units: µg/L	543572	
TPH-C Gasoline		Client ID:		ORGCMS3_051028A			
		Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit HighLimit RPD Ref Val %RPD RPD Limit RPD Limit Qual
TPH-C Diesel (C12-C22)		MB-14520	Batch ID: 14520	Test Code: SGTPHDW	Units: µg/L	543657	
N-Tricosane		Client ID:		ORGC5_051031A			
		Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit HighLimit RPD Ref Val %RPD RPD Limit RPD Limit Qual

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits

B - Analytic detected in the associated Method Blank

CLIENT: City of Arcata
Work Order: 0510458
Project: 000108100, Arcata Corp. Yard

QC SUMMARY REPORT

Method Blank

Sample ID	MB-14478	Batch ID:	14478	Test Code:	TPHDW	Units:	µg/L	Analysis Date	10/21/05 5:37:14 PM	Prep Date	10/21/05
Client ID:		Run ID:		ORGC7_051021A				SeqNo:	541899		
Analyte		Result		Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD
TPHC Diesel (C12-C22)	ND	50									
N-Tricosane	53.4	0.10	50.0		0		107%	70	130	0	

Qualifiers: ND - Not Detected at the Reporting Limit

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R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 01-Nov-05

QC SUMMARY REPORT
 Laboratory Control Spike

CLIENT: City of Arcata
Work Order: 0510458
Project: 000108100, Arcata Corp. Yard

Sample ID	LCS-05692	Batch ID: R37734	Test Code: 82600XYW	Units: µg/L	Analysis Date	10/28/05 07:11:00 AM	Prep Date				
Client ID:		Run ID: ORGCMS3_051028B			SeqNo:	543582					
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	% RPD	RPD Limit	Qual
Methyl tert-butyl ether (MTBE)	18.61	1.0	20.0	0	93.1%	80	120		0		
Tert-butyl alcohol (TBA)	399.6	10	400	0	99.9%	25	162		0		
Di-isopropyl ether (DIPE)	18.85	1.0	20.0	0	94.3%	80	120		0		
Ethyl tert-butyl ether (ETBE)	18.45	1.0	20.0	0	92.3%	77	120		0		
Benzene	20.45	0.50	20.0	0	102%	78	117		0		
Tert-amyl methyl ether (TAME)	17.60	1.0	20.0	0	88.0%	64	136		0		
Toluene	20.51	0.50	20.0	0	103%	80	120		0		
Ethylbenzene	19.30	0.50	20.0	0	96.5%	80	120		0		
m,p-Xylene	39.95	0.50	40.0	0	99.9%	80	120		0		
o-Xylene	18.22	0.50	20.0	0	91.1%	80	120		0		
1,4-Dichlorobenzene-d4	1.11	0.10	1.00	0	111%	81	139		0		
Sample ID	LCS-05692	Batch ID: R37734	Test Code: 82600XYW	Units: µg/L	Analysis Date	10/28/05 7:37:00 AM	Prep Date				
Client ID:		Run ID: ORGCMS3_051028B			SeqNo:	543583					
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	% RPD	RPD Limit	Qual
Methyl tert-butyl ether (MTBE)	18.81	1.0	20.0	0	94.1%	80	120	18.6	1.08%	20	
Tert-butyl alcohol (TBA)	407.7	10	400	0	102%	25	162	400	2.00%	20	
Di-isopropyl ether (DIPE)	18.90	1.0	20.0	0	94.5%	80	120	18.8	0.265%	20	
Ethyl tert-butyl ether (ETBE)	18.47	1.0	20.0	0	92.4%	77	120	18.4	0.0895%	20	
Benzene	20.15	0.50	20.0	0	101%	78	117	20.4	1.47%	20	
Tert-amyl methyl ether (TAME)	17.81	1.0	20.0	0	89.1%	64	136	17.6	1.21%	20	
Toluene	20.28	0.50	20.0	0	101%	80	120	20.5	1.12%	20	
Ethylbenzene	19.16	0.50	20.0	0	95.8%	80	120	19.3	0.746%	20	
m,p-Xylene	39.46	0.50	40.0	0	98.6%	80	120	40.0	1.26%	20	
o-Xylene	17.97	0.50	20.0	0	89.9%	80	120	18.2	1.39%	20	
1,4-Dichlorobenzene-d4	1.12	0.10	1.00	0	112%	81	139	1.11	0.848%	20	

Qualifiers:

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CLIENT: City of Arcata
Work Order: 0510458
Project: 000108100, Arcata Corp. Yard

QC SUMMARY REPORT
 Laboratory Control Spike

Sample ID	Test Code:	Units:	Analysis Date	Prep Date							
Client ID:	Run ID:		SeqNo:								
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPD Limit	Qual
TPHC Gasoline	963.7	50	1,000	0	96.4%	80	120	0	0	0	
Sample ID	Test Code:	Units:	Analysis Date	Prep Date							
LCS-05693	GASW-MS	µg/L	10/28/05 8:53:00 AM								
Client ID:	Run ID:		SeqNo:								
	ORGCCMS3_051028A		543569								
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPD Limit	Qual
TPHC Gasoline	959.9	50	1,000	0	96.0%	80	120	964	0.395%	20	
Sample ID	Test Code:	Units:	Analysis Date	Prep Date							
LCS-14520	SGTPHDW	µg/L	10/31/05 11:56:58 AM	10/27/05							
Client ID:	Run ID:		SeqNo:								
	ORGCC5_051031A		543655								
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPD Limit	Qual
TPHC Diesel (C12-C22) N-Tricosane	410.3 38.7	50 0.10	500 50.0	0 0	82.1% 77.4%	41 38	96 129	0 0	0 0	0 0	
Sample ID	Test Code:	Units:	Analysis Date	Prep Date							
LCSD-14520	SGTPHDW	µg/L	10/31/05 12:25:50 PM	10/27/05							
Client ID:	Run ID:		SeqNo:								
	ORGCC5_051031A		543656								
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPD Limit	Qual
TPHC Diesel (C12-C22) N-Tricosane	451.5 42.4	50 0.10	500 50.0	0 0	90.3% 84.8%	41 38	96 129	410 38.7	9.55% 9.02%	15 15	
Sample ID	Test Code:	Units:	Analysis Date	Prep Date							
LCS-14478	TPHDW	µg/L	10/21/05 3:09:12 PM	10/21/05							
Client ID:	Run ID:		SeqNo:								
	ORGCC7_051021A		541896								
Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPD Limit	Qual
TPHC Diesel (C12-C22) N-Tricosane	558.5 64.8	50 0.10	500 50.0	0 0	112% 130%	67 70	120 130	0 0	0 0	0 0	

Qualifiers: ND - Not Detected at the Reporting Limit
 J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits
 R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

CLIENT: City of Arcata
Work Order: 0510458
Project: 000108100, Arcata Corp. Yard

QC SUMMARY REPORT

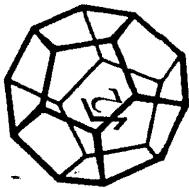
Laboratory Control Spike Duplicate

Sample ID	LCSD-14478	Batch ID:	14478	Test Code:	TPHDW	Units:	µg/L	Analysis Date	10/21/05 3:30:08 PM	Prep Date	10/21/05	
Client ID:		Run ID:		ORG	C7_051021A			SeqNo:	541897			
Analyte		Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	% RPD	RPD Limit	Qual
TPHC Diesel (C12-C22)		588.1	50	500	0	118%	67	120	- 558	5.17%	15	
N-Tricosane		64.8	0.10	50.0	0	130%	70	130	64.8	0.0712%	15	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank



NORTH COAST
LABORATORIES LTD.

56680 West End Road • Arcata • CA 95521-9202
707-822-4649 Fax 707-822-6831

Chain of Custody

Attention:	<u>Kim Watson</u>
Results & Invoice to:	<u>CITY OF ARCATA</u>
Address:	<u>736 F. Street</u>
Phone:	<u>825-2180</u>
Copies of Report to:	<u>SAW - MIKE FOGET</u>
	<u>812 W. LABASH AVE. EUREKA, CA.</u>
	<u>Sampler (Sign & Print)</u> <u>Tom Wiscannon</u>
PROJECT INFORMATION	
Project Number:	<u>000108100</u>
Project Name:	<u>ARCATA CORP. YARD</u>
Purchase Order Number:	<u> </u>

MATRIX: DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT